STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining

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Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Cleon B. Feight, Division Director

February 23, 1983

Mr. David Lundberg
Environmental Coordinator
Geokinetics, Inc.
P.O. Box 1168
Vernal, Utah 84078

RE: Geokinetics, Inc.
Seep Ridge Project
ACT/047/019
Wolf Den Project
ACT/047/020
Uintah County, Utah

Dear Mr. Lundberg:

The Division of Oil, Gas and Mining has completed its initial review of Geokinetics, Inc.'s Seep Ridge and Wolf Den Projects in accordance with the Rules and Regulations of the Utah Mined Land Reclamation Act, Title 40-8, U.C.A. 1953. The attached review list comments, questions and suggestions which have been developed by the staff to enable Geokinetics and Ford, Bacon & Davis to completely satisfy requirements of the Act. Geokinetics' written responses to these areas of concern may either be submitted as addendums to the original Mining and Reclamation Plans or as new documents, incorporating the original submissions.

Should you have any questions regarding the reviews, please feel free to contact me or Tom Tetting of my staff. We would be more than happy to arrange a meeting to discuss any matter(s) which you would like clarified. We look

forward to Geokinetics' response prior to continuing further review and presenting the Mining and Reclamation Plans to the Resource Development Coordinating Committee for its comments.

Sincerely,

JAMES W. SMITH, JR.
COORDINATOR
MINED LAND DEVELOPMENT

JWS/TNT:lm

Enclosure: Mine Plan Reviews

cc: Tom Tetting, DOGM, w/enclosure
Wayne Hedberg, DOGM, w/enclosure
Thomas Portle, DOGM w/enclosure
Susan Linner, DOGM w/enclosure
Pam Grubaugh-Littig, DOGM w/enclosure
Jim Bradley, Energy Office
Warren McOmber, Geokinetics, w/enclosure
Tom Suchoski, Ford, Bacon & Davis, w/enclosure

Seep Ridge Project
Geokinetics, Inc. ACT/047/019
Mining and Reclamation Plan Review

Rule M-3 (1) - TNT

An accurate boundary or permit area, including total acreage to be disturbed, has not been indicated on a map. Topsoil storage locations are missing. A site facilites plan has not been included for section 32. Where is the "off-gas pipeline" located? Where is the 2" diameter natural gas line? Is this the same as the "off-gas pipeline"? Who's pipeline is indicated on the section 2 map? Where are the existing exploration holes represented? Are the "borings" represented on figure D-3 the sum total of drill holes and wells? A map should be presented differentiating between, groundwater monitoring wells, borings, water-wells, etc. These should be correlated with identification names or numbers. Depths of the holes and present status (i.e. open, plugged, capped, etc.) indicated. Where will the transmission lines to section 32 be located?

Rule M-3 (1)(e) / M-10 (8)(11) - WH

Design plans, calculations and typical cross-sections for all drainage control structures to be implemented to handle the disturbed and undisturbed runoff should be submitted. With what will the evaporative pond be lined? What will be the volume of the pond? Where will it be located? What will be the sizing designs?

Rule M-3 (1)(e)(f)(h) - WH

What is the source of ground water recharge to the lower Parachute Creek Member (Mahogany Zone)?

What is the source of ground water recharge to the upper Douglas Creek Member?

When will the "future work" be initiated for the on-site alluvial aquifer?

The applicant states that, "additional monitoring data from a denser pattern of monitoring point and isolated well completion intervals at selected stratigraphic levels are necessary to allow interpretation of the shallow ground water system," (Parachute Creek Member). Is this a commitment to perform these activities or just a recommendation? The Division supports this proposal to acquire this information to quantify and qualify the shallow ground water system.

The Division requests a more detailed explanation of the water quality data supplied with the application. The applicant states that a group of wells were sampled at two month intervals for a period of one year. Minimum, maximum and mean values were presented, however the specific wells that were sampled, the location, when and how many times each was sampled should also be provided in order to interpret the minimum, maximum and average values accurately. The lab analysis for each sample collected, by well, should be provided.

Why is it that shallow ground water quality is so valuable over the site? Are the analytical results expressed in terms of total or dissolved content?

Has the monitoring program been discontinued, if so, are there any plans to reinitiate quality sampling from these wells?

What is the significance of the "sample size", as referenced on Table E-2? Do the numbers correspond to the number of samples taken, to the size (volume) of the sample taken, or to the number of wells?

What are the hydrologic testing methods currently being employed or planned by Geokinetics to "quantify the subsurface effect of blasting and retorting on the overlying, underlying and adjacent rock materials?" When might this information be available for review?

Shallow ground water quality sampling has been performed before and during the burning of the retort. Are there any plans to sample after the retort area has been reclaimed and the hydrologic system reestablished?

Rule M-3 (2)(c) - TNT

What type of "off-site facility" will be utilized for disposal of the sludge materials and where is it proposed to be located? Appropriate State Health Department Bureaus should be contacted and referenced by their approval. A commitment is needed by the operator to break up all concrete foundations and a burial of at least 18 inches is recommended.

What is done with the sulphur recovered from the Stretford process? The ammonia? Where are the solid-waste disposal trenches to be located and what types of solid waste are to be disposed? It has been stated in the MRP that trash will be disposed of in an approved landfill; are these one and the same? Have they been approved by the Department of State Health?

Rule M-3 (2)(e) - SL

There are inconsistencies in the MRP as to specific reclamation methods. On page 8 of Form MR-1 it states in one place that "some areas may need scarification" and in another that areas to be reclaimed will be contoured, terraced, and disced. There is also an ambiguity as to whether or not any irrigation will be used. It is recognized that final reclamation practices have not been chosen yet, as test plots are still underway. The applicant should commit to keeping the Division informed of progress and success of test plots (i.e. by providing annual monitoring reports).

At least 60 days prior to any final reclamation work occurring, Geokinetics must submit to the Division for approval, a complete revegetation plan, inlcuding: seed mix(es) and rate of seeding in pure live seed (PLS) per acre, or stocking rate (stems/acre) for shrub plantings; seedbed preparation; seeding and planting techniques; mulching, irrigation and fertilization methods, amounts and frequencies or duration. If there will be different techniques or seed mixes for different areas, this should be reflected in the success standards that are set. Season of seeding or planting should be indicated. An explanation of how the final reclamation plan was determined from test plot results should be included.

All revegetation species mixes should be consistent with the postmining land use.

Rule M-3 (2)(f) - TNT

In the MRP different answers are provided for questions 17, 26 and 27 which confuse the estimate of the length of time mining is to continue. It is not readily understood whether 4 years, 7 years, 14 years or 20 years should be considered for the length of time. Additionally it would simplify understanding if a yearly, sequential acreage-of-disturbance table were submitted. This should indicate when reclamation will begin and state what and when the maximum acreage disturbances will occur. If an initial facilities site acreage will not be altered during the mining operation, this should also be incorporated into the table as a constant. Concerns are centered around the adjustments necessary for bonding and contemporaneous reclamation.

Also, mining has been indicated to proceed in groups of seven retorts yet only the previously retorted locations have been numbered. What "areas" are to be developed next? Are the "squared-off" areas blocked-out on figures C-1a and C-1b the proposed retort areas?

Rule M-3 (5)/M-10 - TNT

How are the approximate ninety-one post-blast drill holes to be abandoned? What plugging methods will be utilized upon final abandonment of all holes and wells?

Rule M-5 - PGL

A detailed cost estimate is needed to explain the cost per acre for reclamation. Unit costs and types and quantities of materials for the breakdown of reclamation projects should be given. The use of salvage value to offset the bonding requirements is not accepted by the Division.

Rule M-10 - PGL

In the narrative, the applicant stated that unused buildings and foundations will be removed, razed, and buried. Does this include the power plant, pipelines, and sealing of wells? Will all of the buildings and facilities be removed? How deep will the foundations be buried?

Because of the enhancement of the potential for interstrata migration of poor quality surface water with underlying aquifers by blasting, it will be necessary for the operator to submit additional details on the planned hydrologic testing. When will the results be submitted to the Division?

What magnitude of subsidence over the retorts is expected and for how long a period may this be planned? What mitigation measures are planned?

Where is the confidential information located that is stated to be contained in the submittal?

A copy of the signed, notarized page 11 of MR-1 was not included in the plan.

Rule M-10 (6) - TNT

Has the SPCC measure plan been approved by the State Health Department yet?

Rule M-10 (12)(2)(a) - SL

The applicant gives percent existing vegetation cover for several different community types. These communities must be correlated with the areas to be revegetated, in order to determine specific revegetation success standards for each area. The easiest way to do this would probably be to overlay a vegetation map or a map showing retort locations.

No mention was made of surveys for threatened or endangered plant or annual species, or critical habitats for any wildlife species on site including areas of riparian habitat. If any such species or areas exist in proposed disturbance areas, plans to minimize or mitigate impacts must be developed.

Rule M-10 (12)(2)(b) - SL

Monitoring of revegetated areas during the bond release period should be discussed. This should include monitoring methods, timing and duration of monitoring, and methods of determining whether or not the success standard has been achieved. Funds for monitoring of revegetation success should be included in surety calculations.

Rule M-10 (14) / M-3 (1)(f) - TLP

The permit application is lacking in that insufficient information is provided to allow for the development of criteria for a topsoil management scheme.

A more specific soils map prepared for the Seep Ridge Project would be a great asset in planning a topsoil management program. A map should be provided which relates soil series and/or complex and available soil depth to soils to be salvaged. The applicant should relate the location of surface facilities and areas to be disturbed to this map. Please indicate the location of all sample points taken for each soil series on this map. Laboratory tests will aid in detecting any physical or chemical soil conditions which may be detrimental to plant growth and to determine if any nutrients are deficient.

Will soil samples be taken prior to test plot initiation to provide a basis for the application of soil fertility amendments? These tests could include, but not be limited to, soil texture, CEC (Cation Exchange Capacity) pH, electrical conductivity, SAR (Sodium Absorbtion Ratio), available nitrogen, available phosphorus (percent or ppm), available potassium, soluble calcium, magnesium and sodium (expressed as meq/100g).

Such information will be useful in determining the most efficient reclamation methods. Also, the results of test plots to date should be summarized and submitted to the Division. In the latest annual report the applicant states that results from the Forest Service plots were "currently being prepared for publication" and that "a copy of these results would be available" to the Division on request. Please consider this a formal request.

The Division is concerned with statements mentioned by the applicant in "Attachment G". The clause which states that termination of a test plot can occur at the desire of either party upon 30 days notice.

1. If insufficient data is available at the time of termination to adequately comply with permit conditions pursuant to final reclamation plans how will this data deficit be remedied?

2. Is this "formal cooperative agreement" currently in effect or still being drafted?

Topsoil Stockpile Protection

What measures will be employed to acheive adequate topsoil stockpile protection? How will overland drainage be diverted away from the stockpile(s)? Will berms be used to retain whatever topsoil washes off the stockpile? The applicant states in 21C that soil binders and synthetic coverings may be employed? When would this be decided? The Division suggests that the applicant consider a combination of temporary seed mixes, mulching and gently sloped stockpiles. Please provide additional detail regarding whatever method is chosen such as seed mixes, quantities of binders, methods of application, etc.

A. What is the anticipated or typical final depth of each of the stockpiles? How many stockpiles will be associated with each retort or series of retorts?

B. What will be the probable dimensions of each stockpile at its greatest extent?

C. What will be the slope of the stockpiles?

The applicant may best address these concerns by providing typical topsoil stockpile configurations and cross sections.

Rule M-10 (14) - TLP

Soil Redistribution

Based on soil survey results:

1. To what depth will topsoil be redistributed at each minesite?

2. What total volume of topsoil is available? required?

3. Is there a surplus or deficit of topsoil?

4. If there is a deficit from where will the deficit volume be obtained?

In attachment F, the applicant provides baseline soils data including bulk density for Seep Ridge. Will soil compaction resulting from redistribution activities approximate that found in the baseline situation? Will tests be done following redistribution to ascertain this?

lm

Wolf Den Project
Geokinetics, Inc. ACT/047/020
Mining and Reclamation Plan Review

Rule M-3 (1) - TNT

An accurate boundary or permit area, including total acreage to be disturbed, has not been indicated on a map. Topsoil storage locations are missing. Where are the existing exploration holes represented? Are the "borings" represented on figure D-3 the sum total of drill holes and wells? A map should be presented differentiating between, groundwater monitoring wells, borings, water-wells, etc. These should be correlated with identification names or numbers. Depths of the holes and present status i.e. open, plugged, capped, etc., indicated.

A map providing the corridors for the proposed powerline and all pipelines should be submitted. An overall topographic map providing the locations of the adjacent BLM check dams ought to be provided. Documentation of the existing breach may also be useful, e.g. photographs.

Rule M-3 (1)(d)(e)(f) - WH

The detail on the maps is inadequate to assess the design specifics of the project. The following deficiencies should be added:

a. The main topographic features and major drainages should be labeled.

b. Existing gas and oil pipelines, electric powerlines, proposed corridors, etc.

c. Proposed diversions, berms, sedimentation ponds, settling basins culverts and associated drainage control strutures.

d. Directional flow of all surface drainage.

e. Drill hole locations, status (plugged, open, corehole, water well, etc.).

Rule M-3 (1)(e) / M-10 (8)(11) - WH

Design plans, calculations and typical cross sections for all drainage control structures to be implemented to handle the disturbed and undisturbed runoff should be submitted.

With what will the evaporative pond be lined?

What will be the volume of the pond?

Where will it be located? What will be the sizing designs?

Rule M-3 (1)(h) - WH

Attachment E, Hydrology section, seems to infer that aquifer water yield data available in the near future. will it be available? How many site specific ground wate have been collected and analyzed? The applicant states t drilling has been performed on the project site. Have a been plugged? If not, are any accessible for additional sampling? What is the source of recharge to the local sh system? Has any deeper drilling been performed, or is ar that the lower Douglas Creek Member of the Green River Fo nearest aquifer system beneath the project site which cou affected?

What is the expected chemical effect of 500,000 lbs c per retort, upon the shallow ground water system? Is the nitrate consumed by the retorting process?

Rule M-3 (1)(f)(h) - WH

Are there core logs available which depict the site s for the project area? How was it determined that the nex intercepted (lower Douglas Creek Member) is 1000 feet ben

Why wasn't a potential hydrologic impact section simi for the Seep Ridge Project included in the Wolf Den appli applicant feels that the same conditions apply for both s statement or reference to the same should be included.

Title 40-8-17 (1) - WH

Will water generated as a by-product of the retorting permit from the Division of Water Rights prior to use? T on page 5 of 12 that water rights have been appropriated. this statement by providing a copy of an approved water r the State Engineers Office (Division of Water Rights).

Rule M-3 (2)(c) - TNT

What type of "off-site facility" will be utilized for disposal of the sludge materials and where is it proposed to be located? Appropriate State Health Department Bureaus should be contacted and referenced by their approval. A commitment is needed by the operator to break up all concrete foundations and a burial of at least 18 inches is recommended.

What is done with the sulphur recovered from the Stretford process? The ammonia? Where are the solid-waste disposal trenches to be located and what types of solid waste are to be disposed of in an approved landfill; are these one and the trash will be disposed? It has been stated in the MRP that same? Have they been approved by the Department of State Health?

Rule M-3 (2)(e) - SL

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Rule M-3 (5) / M-10 - TNT

How are the approximate ninety-one post-blast drill holes to be abandoned? What plugging methods will be utilized upon final abandonment of all holes and wells?

Rule M-5 - PGL

A detailed cost estimate is requested to explain the cost per acre for reclamation. The unit costs and types and quantities of materials for the breakdown of reclamation projects should be given. The use of salvage value to offset the bonding requirements is not accepted by the Division. The enclosed form may prove to be helpful to fill out cost estimate determinations.

Rule M-10 - PGL

Because of the enhancement of the potential for interstrata migration of poor quality surface water with underlying aquifers by blasting it will be necessary for the operator to submit additional details on the planned hydrologic testing. When will the results be submitted to the Division?

What magnitude of subsidence over the retorts is expected and for how long a period may this be planned? What mitigation measures are planned?

Where is the confidential information located that is stated to be contained in the submittal?

In the application, the operator stated that upon abandonment, the unused buildings and foundations will be removed, razed, and buried. There should be more detail about where the buildings (all or some?) will be taken. How deep will the foundations be buried? Will the powerlines, gas lines, wells, and other industrial facilities be removed or sealed? How?

Rule M-10 (4) - PGL

Will subsidence be a consideration with the extraction of crude shale oil?

Rule M-10 (6) - WH

What plans will be utilized in the event of an oil spill? (i.e., SPCC plan?) Has the SPCC measure plan been approved by the State Health Department yet?

Rule M-10 (12)(2)(a) - SL

The applicant gives percent existing vegetation cover for several different community types. These communities must be correlated with the areas to be revegetated, in order to determine specific revegetation success standards for each area. The easiest way to do this would probably be to overlay a vegetation map or a map showing retort locations.

No mention was made of surveys for threatened or endangered plant or annual species, or critical habitats for any wildlife species on site including areas of riparian habitat. If any such species or areas exist in proposed disturbance areas, plans to minimize or mitigate impacts must be developed.

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Rule M-10 (14) / M-3 (1)(f) - TLP

The permit application is lacking in that insufficient information is provided to allow for the development of criteria for a topsoil management scheme.

Soil data provided in the application for Wolf Den are inadequate as a base to make logical planning designs.

A more specific soils map prepared for the Wolf Den Project would be a great asset in planning a topsoil management program. A map should be provided which relates soil series and/or complex and available soil depth to soils to be salvaged. The applicant should relate the location of surface facilities and areas to be disturbed to this map. Please indicate the location of all sample points taken for each soil series on this map. Laboratory tests will aid in detecting any physical or chemical soil conditions which may be detrimental to plant growth and to determine if any nutrients are deficient.

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The applicant may best address these concerns by providing typical topsoil stockpile configurations and cross sections.

Rule M-10 (14) - TLP

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In attachment F, the applicant provides baseline soils data including bulk density for Seep Ridge. Will soil compaction resulting from redistribution activities approximate that in the baseline situation? Will tests be done following redistribution to ascertain this? Will baseline bulk density data be obtained from the Wolf Den project?

General Comment - WH

Attachment C, refers the reviewer to Figure C-1 for a development sequence. This figure was not located within the MRP submission. If this figure is pertinent, it should be included as part of the plan. The applicant states that the hydrotreated shale oil will be stored on-site in two 12,000 barrel tank farms consisting of two 60,000 barrel tanks. Would the applicant please clarify this statement?

In Attachment C, there seems to be a contradiction in the amount of on-site storage for syncrude. In Section 7, (central facilities) it is stated that 40 days of production could be stored on-site, while in Section 8 (off-site facilities) it is stated that storage for 20 days of oil production will be available on-site. Which is correct?

It would be useful to number all of the pages in the application in order to make it easier to reference a particular section as questions may arise during review.

lm